

**Stage I Assessment Report,
Volume 2 — Economic Assessment:
Kalamazoo River Environment**

Final Report



Michigan Department of Environmental Quality,
Michigan Attorney General,
U.S. Fish and Wildlife Service,
and
National Oceanic and Atmospheric Administration

Prepared by:

Stratus Consulting Inc.
PO Box 4059
Boulder, CO 80306-4059
(303) 381-8000

March 15, 2005
SC10093

Contents

List of Figures.....	v
List of Tables	vii

Chapter 1 Introduction.....	1-1
1.1 NRDA Concepts	1-2
1.2 Public Comment and Information Quality.....	1-3
1.3 Stage I Economic Damages Assessment Approach.....	1-4
1.3.1 Approach for estimating costs for restoring injured resources and services to baseline	1-4
1.3.2 Approach for determining compensable values for interim losses.....	1-5
1.4 Summary of Stage I Compensable Value Determination Results	1-8
1.4.1 Recreational fishing compensable damages	1-8
1.4.2 Total Value Scoping focus groups.....	1-9
1.5 Organization of Report	1-9
Chapter 2 Recreational Fishing.....	2-1
2.1 Introduction.....	2-1
2.2 Kalamazoo River Target Species and Fish Consumption Advisories	2-2
2.3 Behavioral Responses to FCAs.....	2-5
2.4 Estimates of Kalamazoo River Recreational Fishing Use	2-9
2.5 Estimates of Kalamazoo River Fishing Use in the Absence of FCAs.....	2-16
2.6 Estimates of Economic Values for Reduced Quantity and Quality of Fishing	2-23
2.7 Results: 2001 Damage Estimates.....	2-32
2.8 Results: Aggregating Damages over Time	2-34
Chapter 3 Total Value Scoping Focus Groups.....	3-1
3.1 Objective of TVS	3-1
3.2 Focus Group Development and Implementation	3-1
3.3 Recruitment.....	3-2
3.3.1 Response rate	3-3
3.3.2 Respondent demographics	3-4
3.4 Implementation	3-6
3.4.1 Methods	3-6

Contents

3.5	Analysis	3-6
3.5.1	Telephone survey: Recreation and attitudes	3-6
3.5.2	Discussion of written focus group handouts.....	3-9
3.5.3	Impressions from discussions in the focus groups.....	3-23
3.6	TVS Summary	3-26
3.7	Atkin General Population Survey Results	3-27
3.8	Conclusions.....	3-31
Chapter 4	Restoration Planning	4-1
4.1	Overview of Restoration Planning.....	4-1
4.2	Criteria for Evaluating Restoration Alternatives	4-3
4.3	Proposed Restoration Projects	4-6
4.4	Conclusions.....	4-8
References.....		R-1

Appendices

A	Summary of Potential KRE Restoration Projects
B	2001 Kalamazoo River Recreational Angler Study
C	Fish Consumption Advisories
D	Recreational Angling Benefits of Improved Quality on Kalamazoo River, Michigan (prepared by Frank Lupi, PhD, Michigan State University)
E	Focus Group Materials
F	The Kalamazoo River NRDA Property Appraisal Analysis (prepared by Ritter Appraisals, Inc.)

Figures

2.1	Kalamazoo River and St. Joseph River	2-3
4.1	Process for identifying, selecting, and costing preferred restoration alternatives	4-2

Tables

1.1	Injured resources and services monetized or addressed qualitatively in the Stage I economic damages assessment	1-6
2.1	Selected Great Lakes studies of behavioral responses by anglers to FCAs	2-6
2.2	Estimate of fishing days on the Kalamazoo River.....	2-11
2.3	Second-best estimate of fishing days on the lower stretch of the Kalamazoo River based on St. Joseph River growth rate.....	2-13
2.4	Estimate of fishing days for Lake Michigan area affected by the Kalamazoo River PCB contamination, April through October, 1985-2001	2-15
2.5	Changes in fishing use from change in conditions	2-17
2.6	Estimated reductions in central Kalamazoo River fishing days due to Kalamazoo River FCAs	2-20
2.7	Estimated reductions in lower Kalamazoo River fishing days due to Kalamazoo River FCAs	2-21
2.8	Estimate of Lake Michigan lost fishing days due to Kalamazoo River PCB contamination.....	2-22
2.9	Selected valuation studies for the reduction of toxins at fishing sites	2-24
2.10	Value of reduction in quality of existing fishing days from Breffle et al.....	2-26
2.11	Per-day consumer surplus values for river and Great Lakes recreational fishing	2-29
2.12	Annual damages for reduction in quality of existing fishing days and reduction in fishing days on the Kalamazoo River and Lake Michigan.....	2-33
2.13	Present value of past recreational fishing damages through 2002	2-35
2.14	Present value of future recreational fishing damages starting in 2003	2-36
2.15	Present value of total recreational fishing damages from 1981 forward	2-37
3.1	Telephone survey response rate	3-4
3.2	Sociodemographics of focus group participants, nonparticipants, and Kalamazoo area.....	3-5
3.3	Recruits and participants by session	3-6
3.4	Participation in outdoor recreational activities since January 1, 2001	3-7
3.5	Results for Question 7: Importance of 10 Michigan issues	3-8
3.6	Respondents' ranking of most important issues facing Michigan	3-9
3.7	Familiarity with the Kalamazoo River.....	3-11
3.8	Respondent activities in or near the Kalamazoo River.....	3-12
3.9	Coding of open-ended responses to Question B3	3-13
3.10	Coding of open-ended responses to Question B4	3-14
3.11	Awareness of resource issues	3-15

Tables

3.12	Attitudes toward costs of cleanup and economic development	3-16
3.13	Motivations for preservation of natural resources	3-16
3.14	Prior exposure to information on resource topics	3-18
3.15	Importance of natural resource topics.....	3-20
3.16	Behavioral response to recreational improvements.....	3-20
3.17	Response to temporal effects of PCBs.....	3-21
3.18	Ranking of natural resource programs.....	3-22
3.19	Funding priorities for natural resource programs.	3-23
4.1	Acceptability criteria for restoration.....	4-4
4.2	Focus criteria for restoration.....	4-4
4.3	Implementation criteria for restoration	4-5
4.4	Benefit criteria for restoration.....	4-6
4.5	Summary of types of restoration projects proposed to Trustees and which meet the acceptability criteria.....	4-7